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Abstract

As generative AI chatbots reroute procedures around information seeking, challenges increase with assessing and implementing relevant source material. Interactions between users and chatbots differ from previous paradigms of information seeking (i.e., search engines, library stacks), as these chatbots summarize information probabilistically through dialogic interactions, leveraging natural language-based signifiers of expertise and intelligence to persuade users of their utility and trustworthiness. This challenge could present significant risks for users who engage with these chatbots without clear expectations or expertise on the topic of their query. Our methodology in this paper comes from Ian Bogost's concept of procedural rhetoric, which examines how arguments are constructed (and persuasion takes place) through rule-based processes. We investigate how interactions relating to high stakes domains that value accuracy and precision, such as medicine and academic research, are subtly (and not-so-subtly) reshaping users' experiences and expectations surrounding information seeking. While seemingly authorless, AI-generated text nonetheless reflects human motives, values, and ideals that have been embedded here, as they are in all technological objects, systems, and structures. Accordingly, there is a need to understand how the procedures surrounding information seeking practices are informed by users' values, experiences, and expectations-and how this might in future be altered by the emerging turn towards AI "experts" and authority.

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Expertise and Information Seeking in the Age of Generative AI: New Procedures, New Problematics

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***Abstract*—As generative AI chatbots reroute procedures around information seeking, challenges increase with assessing and implementing relevant source material. Interactions between users and chatbots differ from previous paradigms of information seeking (i.e., search engines, library stacks), as these chatbots summarize information probabilistically through dialogic interactions, leveraging natural language-based signifiers of expertise and intelligence to persuade users of their utility and trustworthiness. This challenge could present significant risks for users who engage with these chatbots without clear expectations or expertise on the topic of their query. Our methodology in this paper comes from Ian Bogost's concept of procedural rhetoric, which examines how arguments are constructed (and persuasion takes place) through rule-based processes. We investigate how interactions relating to high stakes domains that value accuracy and precision, such as medicine and academic research, are subtly (and not-so-subtly) reshaping users' experiences and expectations surrounding information seeking. While seemingly authorless, AI-generated text nonetheless reflects human motives, values, and ideals that have been embedded here, as they are in all technological objects, systems, and structures. Accordingly, there is a need to understand how the procedures surrounding information seeking practices are informed by users' values, experiences, and expectations—and how this might in future be altered by the emerging turn towards AI "experts" and authority.**

***Index Terms*—generative artificial intelligence, information seeking, procedural rhetoric, chatbots, expertise, research**

I. Introduction

THE process of gathering, evaluating, and applying new information is a shared human experience that goes back millennia. As information has been codified and collected in new ways (such as libraries, archives, websites, and databases), methods of information seeking have, accordingly, developed in tandem. Routine information seeking has historically involved the consultation of reputable sources, whether that be the local newspaper, a family doctor, or a trusted neighbor. While traditional forms of information seeking are now well understood, the advent of generative AI has introduced new complexities and considerations for information seeking in many different contexts. Indeed, for both scholars and the broader public, information seeking is being drastically reconfigured, in particular by the emergence of generative AI chatbots.[1]

Since 2023, generative AI has been used widely through chatbot interfaces such as ChatGPT (OpenAI), Claude (Anthropic), and Google Gemini, among others. Language models (LMs), the basis of these chatbot interfaces, are built using a combination of supervised learning, reinforcement learning, and other natural language processing techniques. LMs have begun to fulfill a variety of roles [1] for human users, ranging from schedulers and virtual assistants to tutors, coaches, counsellors, and confidantes. Indeed, Hirvonen et al. assert that "artificial intelligence is poised to reshape human behavior, with its influence extending to search engines, social media, and nearly every aspect of the Internet" [as summarized in 2]. If search engines are already conceived of as "cognitive authorities" and "influential sources of expertise" [3], what does this shift to AI portend for questions of expertise, authority, and information seeking? These questions are being taken up in a variety of fields and disciplines.

Looking specifically at the intersection of rhetoric (our field of study) and generative AI, however, research has been largely limited to analyzing, producing, or testing various prompts or generated outputs. Topics of investigation include "Socratic" chatbots for pedagogical purposes [4], [5], [6], concerns over perceptions of accuracy and truthfulness [7], [8], [9], and testing of various LMs' capabilities to produce rhetorically effective, i.e. persuasive, content [10], [11], [12], [13], [14]. Aiming to expand this content-specific focus, in previous work [15], we described how chatbots persuade users to reconfigure their thoughts, behaviors, and practices in three domains: information seeking, language construction, and social relationship building. In this paper, we continue in this vein of thought with an explicit focus on information seeking procedures. Specifically, we examine the process of seeking, accessing, and utilizing "expert" information.

We begin with a discussion of our methodology, drawn from the field of rhetoric—an area of inquiry spanning over two millennia concerned with persuasion and communication—to assess the implications of supplanting human-centered expertise in information seeking practices. We identify a particular subset of rhetoric, procedural rhetoric, as our key means of analysis. We provide a general overview of the concepts of information seeking and expertise, which are then elucidated in two examples: medical information seeking and academic information seeking. While they involve different information sets, users, and end goals, these two procedures (understood as "rule-based interactions" [16, p. ix]) are both sites where persuasion can and does take place, spurring users to hold certain opinions and possibly take certain actions based on the information they gather. For both examples, we consider

[1] We refer to "generative AI chatbots" throughout the paper to distinguish between an AI chatbot, specifically, and a language model (LM), which is the architecture that underlies the chatbot interface. That is to say, users interact with the interface and product features on top of the underlying architecture, as opposed to directly interacting with a LM.

the use context, the shifting procedures heralded by generative AI, and the ethical considerations and concerns that arise from the "arguments" conveyed (including issues relating to transparency, trust, bias, and interpersonal relations).

If, as Lund et al. suggest, the integration of generative AI into information seeking practices "conflicts with the natural behavior that humans engage in to successfully obtain information" [2, p. 2]—what are the effects of this shift, and how will it affect users' experience in the present and future? In this paper, we therefore explore the shifting logics and implications surrounding information-seeking practices with the threefold intention of A) identifying AI-related changes in information-seeking procedures, as well as in conceptions and enactments of expertise; B) understanding some broader consequences of shifting information-seeking to AI; and C) recommending actions to prepare for future engagements with AI "experts."

By combining scholarly literature and research across computer science, science communication, and rhetorical studies, we highlight how humanities-based scholarship can inform ethical analyses of emerging technologies. As such, we address a multi-disciplinary audience that includes not only researchers, scholars, and educators, but also the everyday users of generative AI chatbots who are most implicated in, and impacted by, the changes wrought by AI in the information-seeking landscape.

II. Methodology

The methodology we employ here is drawn from rhetorical scholarship, specifically a subset of digital rhetoric called *procedural rhetoric*. While not commonly applied in STEM-focused work, rhetoric is a highly useful concept, especially as it pertains to the notion of expertise [17]. Broadly construed, the term refers to "the art of persuasion," effective communication, or symbolic expression. Stretching from the fourth century BCE to present day, studies in and of rhetoric seek to identify what Aristotle termed the "means of persuasion" available in myriad situations and environments. Crucially, these means of persuasion can be found not only in "human-to-human" rhetoric (i.e., in speech or writing), but also through the modulation and manipulation of public space, visuals, objects, and processes.

In this paper, we focus in particular on persuasive *processes*, studied through the lens of Ian Bogost's procedural rhetoric. Procedural rhetoric can be assessed empirically insofar as it "measures and classifies the persuasive processes involved in computational systems" [18, p. 12]. It refers to "the art of persuasion through rule-based representations and interactions rather than the spoken word, writing, images, or moving pictures" [16 p. ix]. It creates arguments in favor of certain practices or modes of interaction, not only between humans and computers (i.e., how a user interacts with their AI chatbot), but also between humans and information (i.e., how users find and interpret information) and between humans generally (i.e., how users interact with each other in both online and physical spaces). For example, when AI chatbots respond to human users' queries, they are following a series of encoded procedures that determine why and how their responses will be formed (see [15]). Furthermore, when users turn to AI chatbots *for* responses to their queries, this is another important procedure to study rhetorically. In the case of information seeking specifically, AI systems can now stand in for the actual information-gathering process, offering a "truncated" experience that unfolds in a linear fashion [2].

A procedural rhetorical lens considers how users construct and find meaning in their interactions with processes or procedures, which may range from computer programming to government bureaucracies [16, p. 5]. As Bogost emphasizes, procedures are important because they "found the logics that structure behavior" [16, p. 7]; to study procedures is to study the values, beliefs, goals, and assumptions that underpin them. In asking "how does this work?" when analyzing "cultural, social, and historical systems," we are really concerned with understanding the "logics that motivate their human actors" [16, p. 8]. As more people use chatbots, they will not only reference but may come to rely on LMs for information previously obtained through a human source. What does it mean to trust a chatbot, imbuing it with expertise and authority? This is a particularly high stakes concern for medical and science information-seeking, for instance, and will also impact other core processes, such as how individuals learn language, develop social skills, and seek fulfillment in their lives.

III. Key Concepts

A. Information Seeking

Information seeking practices and behaviors have been a focus of library and information science, psychology, and science and health communication since the 1950s [2]. Generally speaking, information seeking involves sourcing and evaluating resources, thereby determining if they are relevant and satisfactory for the task at hand. The formal process of conducting research—whether by walking the stacks, querying a database, or searching the web (not to mention earlier forms of oral traditions or epistolary networks, for example)—has always been characterized by the available technology and the cultural assumptions of what it means to know something. These modes of information seeking have evolved with and through emerging technology.

Generative AI is the latest innovation in a long history of technology used for this purpose. It represents a notable shift from Google Search, though it is still misperceived as doing information retrieval. According to Hirvonen et al., some of the new opportunities that have emerged in information seeking through the integration of AI systems include: "multimodal search, information retrieval in human-like interaction, and creation and modification of information to meet specific information needs" [19, p. 1159]. We will provide a brief example elucidating the information retrieval methods through a Google search versus a discussion with an AI chatbot that captures these qualities quite strikingly. Typing "headache remedies" into the Google search bar will yield many pages of possible sources, which can be altered through changes to the search query. Conversely, typing "how can I get rid of my headache?" into an LM will elicit a human-like exchange, starting with something to the effect of: "Here are some effective ways to get rid of headaches, depending on the type and severity…" The user can then further clarify their query: "I

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think I have a tension headache" or "What causes cluster headaches?" or "Can I take Advil with a migraine?" The chatbot will respond to each query as easily and quickly as the previous.

This AI-assisted information search uses what we call a *dialogic method* that mimics the experience of learning through discussion, as opposed to the emphasis being on the user to sift through the data (although this data has already been ordered based on relevance or other factors in traditional search engines). That is to say, the LM responds to an unedited prompt ("how can I get rid of my headache?"), typed in the same way that the user would naturally verbalize the query, rather than requiring the user to translate their query into structured search terms. Furthermore, the LM responds with a natural response of its own, rather than a list of sources that the user must then assess. The user thus receives "an almost human explanation put together from sources previously siloed across the internet" [20]. While both methods have their advantages, AI chatbots display some concerning aspects for both the process of knowledge construction and of the procedures for accessing, interpreting, and integrating information. These are two very different "symbolic systems" impacting "human thought or action" [16, p. 5]—particularly, in this case, perceptions about the process through which knowledge is constructed, accessed, and obtained.[2]

B. Expertise

The term "expert," Ericsson explains, is "derived from the same root as experience and experiment, which refers to efforts to learn from experience"; expertise refers, generally to the state of having "gained special skills or knowledge representing mastery of a particular subject through experience and instruction" [22, p. 508]. Accordingly, as Collins and Evans describe throughout *Rethinking Expertise*, gaining expertise and "becoming an expert" are processes that require both individual accomplishment and external recognition [23].[3] To put this in a slightly different way, expertise can in fact be considered as an example of procedural rhetoric at work. The "argument" in favor of a given individual's expertise is one that is constructed over time, iterated in many settings, with many audiences, challenged and upheld in many ways. That is to say: the rhetorical force of the argument does not come only from the *content* of an expert's work, but also from the ways in which that content is discovered, conveyed, negotiated, and solidified. Human experts do not become experts in a vacuum; they become experts only over a long period of time, with sustained intellectual effort, and (most importantly), with the support of institutions, regulatory bodies, and the public. Indeed, as Mehlenbacher states: "experts and expertise, although most readily identifiable at the level of individual, are concepts that are constituted also by the communities and the spaces where an expert is situated and when expertise takes place" [17, p. 3].

Despite the wealth of academic literature on expertise, however, the concept continues to come under fire in popular discourse. Indeed, the question of what, exactly, constitutes expertise—and who or what can claim expert status—has come to the forefront in recent political conversations, the COVID-19 pandemic, and now, increasing interest in (and integration of) LMs and AI chatbots. If expert status is "achieved by a complex negotiation with an audience of epistemic claims, a cultivation of skills, and capacities for deliberation and moral judgment" [17, p. 3], how do we account for the status of generative AI systems that do not engage in any of these practices? While AI systems do engage in a problem-solving process similar to that of human information seekers (as described in [2] and [24]), this does not mean that the AI system can itself be considered an expert, or that its outputs should be accepted unquestioningly.[4]

Furthermore, experts must make use of, and have a responsibility to uphold, what Piller calls "rhetorical humanity' [26]—that is, "the perceived effort, care, and ethical responsibility that audiences expect from communicators" [27]. While Piller's work focuses on crisis communication, it is more widely evident that people expect experts (whether crisis communicators, doctors, or scientists) to also demonstrate rhetorical humanity in their addresses to the public. Generative AI is, by its very definition, unable to invoke rhetorical humanity, though Piller points to some particular complications and conflicts that have recently arisen in this regard (specifically, the AI-generated response to a school shooting that took place in 2023) [26]. Most users are, of course, implicitly or explicitly aware of generative AI's limitations in these areas. However, this has not prevented an increasing number of people from enlisting and engaging with AI chatbots.

The ability for laypeople to accurately recognize and act on expertise is crucial across many contexts, but perhaps most especially in the act of information seeking. The seemingly authorless, near-instantaneously generated text has, it seems, its own aura of expertise that convincingly persuades users of the veracity of the information provided therein. With our examples below, we look at these new processes from three angles: the particular procedures that AI chatbots are being integrated into; how AI chatbots are reshaping users' expectations and experiences with technical or specialized knowledge; and some of the repercussions of trusting AI as an expert.

IV. Example 1: Medical Information Seeking

In this section we will discuss the first of two examples of information seeking procedures to investigate potential implications of generative AI systems supplementing (or supplanting entirely) a user's course of action. In particular, we will examine how certain "rule-based representations and interactions" [16, p. ix] are being reconfigured through the integration of AI into information seeking in medical scenarios. As we will explore here, the new "rules of engagement" for requesting, receiving, and integrating medical information may

[2] For an analysis of user switching from search engines to generative AIs using a push-pull-mooring analysis, see [21].

[3] There are "numerous theories of how one gains knowledge, skills, or practices can be found across various scholarly fields" [17, p. 7], though such discussions are beyond the scope of this work.

[4] Though Öhman even goes so far as to suggest that AIs are best likened to gods, in the "anthropological sense" [25].

have a deeper and more pervasive impact than the users and providers of these services initially recognize. We therefore ask: *how do medical LM systems impact a patient's information-seeking procedures—and the broader procedures for seeking medical care?* It is important to note here that we are investigating medical LM systems in particular, as opposed to medical AI scribe tools, which are growing in popularity within clinical settings; while the latter is simply a transcription support tool, the former actually provides medical advice to the user.

A. Context

Medical practice relies heavily on the physician-patient dialogue, where communication, empathy, and trust cannot be separated from the physician's expertise in history-taking, diagnosis, treatment, and management [28]. As noted by Tu et al., clinical history-taking and diagnostic dialogue is a complex skill that is highly dependent on context, including the patient's genetics, environment, and lifestyle. This dialogue is essential to effective, compassionate, and accessible care; it is estimated that 60-80% of diagnoses are made through history-taking alone [28].

However, for a variety of reasons (which we will discuss below), some individuals may choose not to engage directly with practitioners. Instead, they turn to online resources and sources for support with symptom management, diagnoses, or treatment plans.[5] While we focus specifically on the use of medical chatbots, before AI tools were publicly available, individuals used internet-based tools, webpages, and platforms to research their symptoms and potential treatments. Indeed, searching the internet for medical information is not at all new—health, communication, and science research has duly investigated the prevalence of online information seeking over the last twenty years [2].

Since the early 2020s, the amount of users who not only reference but *rely* on AI chatbots to self-diagnose, locate health resources, and determine the need for professional care has skyrocketed [2]. In fact, a 2025 study [30] "found that while search engines and institutional health websites continue to be the dominant sources of online health information, about 21% of respondents had used [LM]-based chatbots for medical purposes" and "among those who reported using [LMs], nearly half (48.4%) said they followed the advice provided" [31]. Furthermore, Wang et al. point to several recent studies that have explored the potential of generative AI in the medical domain, which they cite as showing "promising capabilities in clinical reasoning ranging from medical question answering [32], to interactive history taking [28] and accurate differential diagnosis development" [33], [34]. Importantly, though, Jin et al. assert that ChatGPT "has not yet matured enough for clinical use. Therefore, users must retain full responsibility for verifying the accuracy and reliability of its output" [35, p. 1306]. Studies in patient usage patterns, perceptions, and actions in more specialized medical AI tools are already being conducted in a variety of settings [30]. That being said, among LM uses, medical information seeking is a high stakes endeavor for users; experts are cautious about the impacts of these human-AI healthcare interactions, specifically in how well users are able to interpret and utilize LM responses to make health decisions and in what ways LMs succeed or fail at providing helpful and harmless information.

Another reason for caution is the public's current familiarity with "out-of-the-box," general purpose LMs as opposed to fine-tuned, expert-developed systems that hold more potential for scalable, verified medical advice. One example of the latter type of system is an AI chatbot named "Jennifer" that was developed by a global team of healthcare experts to provide "credible and easy-to-access" information during the COVID-19 pandemic [36]. This chatbot underwent a rigorous design and development process, as well as frequent updates to ensure the currency of the information distributed through the portal throughout the pandemic. Another expert-developed system for medical advice is Google Research's Articulate Medical Intelligence Explorer (AMIE). AMIE is an LM-based system designed to simulate diagnostic dialogue across different disease conditions, specialties, and patient contexts [28]. Earlier efforts to design medical LMs showed they are capable of single-turn medical question-answering with high accuracy and may match or exceed human diagnostic performance in specific narrow tasks [28]. AMIE aimed at a more complex version of this task: requiring the AI system to acquire the relevant information from patients through conversation in a similar way to a clinician.

B. Procedural Analysis

Using Bogost's procedural rhetoric, we can unpack and investigate "the logics that structure behavior" [16, p. 7] within medical information seeking practices—specifically, the behaviors and rationales of the users who prefer to engage with medical LMs as opposed to human practitioners. It is noteworthy to identify some similarities in how medical LMs and traditional physician-patient dialogue function. Medical LMs fulfill roles for their users, as do all AI chatbots, by following "scripts" that determine the content and delivery of their responses [1]. They are designed to interpret and enact certain procedures that govern interactions and, on a larger scale, relationship dynamics. Of course, "procedures" for interpersonal interactions, especially in medical professions, are also often scripted; doctors are trained in how to interact with their patients in order to gain the information needed to provide diagnoses and determine next steps [28]. However, we want to emphasize the important differences between traditional information-seeking procedures (i.e., seeing a doctor or specialist) and AI-supported information-seeking procedures (i.e., typing symptoms into a chatbot) in medical contexts.

Following Bogost, when we ask "how does this work?" about the way people engage with medical doctors or their AI analogues, we are also interested in determining why the traditional system *doesn't* work for particular individuals or groups. There are many reasons why individuals might prefer using an AI chatbot, and these reasons are often enmeshed with

[5] A consideration of physicians' information seeking practices, while beyond the scope of this paper, has been productively addressed by Kannampallil et al. [29].

issues of access and social barriers. For example, some users might live far from a doctor's office and be unable to access care or support when needed. Other individuals might fear discrimination or stigmatization due to medical condition, gender, sexual orientation, or race [37]. Socioeconomic status also plays a role, especially in countries where healthcare is privatized. The procedures for patient-doctor interactions may themselves also be a deterrent. Diagnostic tests or examinations may be uncomfortable, either physically or psychologically, and so the turn to AI chatbots can circumvent these less pleasant aspects of medical care. Of course, these aspects are crucial to receiving proper diagnoses and care, but the prospects of a physical examination, or blood testing, or biopsies, are far less appealing than the simple action of texting symptoms or uploading images into a chatbot interface. In-person doctor visits also make it more difficult for patients to dissimulate or deflect ("the numbers don't lie"), whereas in AI-supported interactions, the users' perceptions of their own symptoms or experiences are not (and cannot be) called into question.

When translated and encoded into LMs used for medical chatbots, the rules of engagement become detached from the contexts and constraints that affect human-to-human interactions (as well as the individual circumstances that might dictate a doctor's response to a patient's revelations). This can be positive, as noted above, in the sense that users no longer need to wait to access care from a licensed professional. Medical AI chatbots enable users to circumvent long wait times or lack of available doctors. Users can avoid fear or embarrassment over conditions or questions that they might have (as Park et al. demonstrate in their exploration of AI-powered chatbots for adolescents' mental and sexual health, where sensitive queries can receive confidential and non-judgmental support [38]). Furthermore, unlike human doctors, medical chatbots are never too busy, tired, or overworked to respond to a patient's query. As AI chatbots become more sophisticated, capable of natural language responses in real time—and, with the release of ChatGPT's Advanced Voice Mode, able to speak in the voice and persona of the user's choosing—the procedures (and expectations) surrounding "doctor"-patient relationships they cultivate will become more entrenched. Further, multimodal AI (i.e., systems that are able to process photo, video, or audio inputs and produce a highly detailed response or even converse with users about a digital document or media in real-time through screen-sharing features; see Google AI Studio) will emulate the experience of accessing immediate, in-person care.

It is quite possible that in the future, individuals will prefer (and some already do [39]) to engage with AI chatbots that have become attuned to their particular preferences for information delivery, "bedside manner," or approach to treatment (i.e., naturopathic, pharmaceutical, etc.). To this end, patients are accustomed to the interactivity of discussion with a clinician. As Paruchuri et al. explain: "one hallmark feature of real-life patient communication (with both clinicians and LMs) is the interactivity of the discussion; patients generally don't provide all of the requisite details in an initial message, particularly as they don't always know what information is important" [40, p. 7]. Because of this, "language models have to reason under incomplete information, a scenario which can come with nontrivial performance degradation" [40, p. 7]. As a further concern, "users frequently engage in repetitive information-seeking loops, especially for ambiguous problems (i.e., mental health), and may unintentionally omit context, leading to potentially misleading responses." There is also the baseline fact, as Karches notes, that "artificial intelligence lacks a human body, which conditions human perception and understanding" [41, p. 31]; as such, any medical LM will eventually hit this insurmountable wall, on the other side of which is the very human *experience* (of health, illness, or simply having a body) that conditions human-to-human interactions.

As we have discussed in this section, there are many driving "arguments" (both implicit and explicit) for the shift to AI-supported medical information seeking. Traditional healthcare comes with its own hurdles and barriers, making AI chatbots an attractive option for many medical information seekers. As users shift to this mode of information seeking, the activities of history-taking, diagnostic testing, and treatment planning (among others) will be reshaped by AI systems that lack the core features that connect doctors and their patients. In the following section, we discuss some of the potential ramifications and questions that arise from this shift.

C. Key Concerns

Despite the obvious and immediate benefits that medical AI tools deliver to patients, the potential for new procedures surrounding doctor-patient interactions espoused by AI chatbots will likely have deeper consequences, for both patients and doctors. As Tu et al. note: "The physician–patient dialogue extends beyond history-taking and diagnosis—it is a complex interaction that establishes rapport and trust, serves as a tool for addressing health needs and can empower patients to make informed decisions that account for their preferences, expectations and concerns" [28, p. 442]. How will the intrusion of AI affect patient empowerment and decision making, especially when so much of diagnosis is contextually determined and dependent [28], [42]? Indeed, findings in one study by Hao et al. suggest that there is a "significant mismatch between LM and human expert estimated relevance in the evaluation of clinical vignettes" [42, p. 9].[6]

Some studies point to the need for increased AI literacy and prompting skills in order to effectively utilize medical AI chatbots, stating that "the focus should be on ensuring the reliability and interpretability of the models themselves rather than relying solely on individuals' ability to interpret their outputs" [2, p. 2], [44]. Further, a study by Soboleva and Mills found that "information accuracy, unbiasedness and currency are key determinants of decision utility; with trustworthiness, these are the most important influences on generative AI use for medical information" [45, p. 6]. However, the ability to assess the accuracy and currency of the responses given requires at least some baseline knowledge of the topic under consideration. For example, how can a user confirm they have received valid advice

[6] Although Zhang et. al have pointed to an increase in emotional and cognitive empowerment based on AI-based medical consultations [43].

about treating a tension headache unless they already know a) that they are, in fact, suffering from a tension headache (as opposed to the myriad other types of headaches) and b) the information provided by the LM fits with their preexisting experience or knowledge? Additionally, the currency of the LM's dataset is a question, especially in emerging or contested areas of medical knowledge (ranging from something as simple as the "R.I.C.E." method of treating injuries to the diagnosis and treatment of women's reproductive health conditions such as endometriosis or Polycystic Ovary Syndrome).

Lastly, there is the question of user privacy and clinical safety [2]. For example, a concern for doctors is which system to choose, as data privacy laws around medical information vary in different countries (for example, the EU and Australia have far tighter restrictions on data privacy than do the United States or China). What laws around privacy will apply to medical AI, and how can users ensure that their data remains private? Existing concerns about denials for life and health insurance based on private data could become realized if the models used in AI-assisted medical information seeking have dubious or underdeveloped privacy laws.

IV. Example 2: Academic Information Seeking

In this section we discuss information seeking procedures in academia, specifically the practices of undergraduate students engaging in research. As with medical information seeking, academic research is also being reshaped in important ways that bear examination in order to identify how learners can be prepared and supported for information seeking in the age of generative AI.

A. Context

In this example, we conceptualize "information seeking" in academic contexts primarily as the process of conducting research. It is important to note that people in all levels of academia might engage in research, and that anyone coming into the research process post-2022 will have a fundamentally different experience with the procedures for research and information seeking. For the purposes of this paper, we are most concerned with research conducted at the undergraduate level, as these information seekers are less likely to have the experience and know-how that seasoned researchers use to guide their information seeking. As such, we identify student information seekers as those most likely to be affected by the integration of AI chatbots into their research process.

B. Procedural Analysis

In general, the research process is tied to long-held disciplinary and epistemological norms. For instance, the research process for the humanities (i.e., literature reviews) is taught and practiced differently than that favored in STEM (hypothesis, methodology, observations, etc.). What is of particular note in the disruption of the research process—for all disciplines—is the way in which a simple prompt can now encapsulate and conflate all steps in the research process. Rather than taking place as a systematic and iterative process of search, discovery, and synthesis, "research" is subsumed into one repeated action (prompting or querying an AI system). The valuable process of gathering and sifting through information, which itself supports the ability to discern relevance and credibility, is reduced or eliminated all together. Meanwhile, the user's perception of and grasp on the given topic is systematically narrowed as they receive popular or generic information, while more diverse and innovative perspectives may go unnoticed (unless the user specifically knows how to prompt for such anomalies).

Furthermore, the procedure around information seeking is shifting away from a search-and-recall method wherein the onus is on the user to find, consume, and comprehend information of varying levels of difficulty, relevance, and reliability. Instead, the user asks questions and is rewarded with information that has already been located, scanned for relevance, summarized, and delivered in a highly readable and accessible format. This procedure is, at a very basic level, more appealing to many users because the generated information is already tailored to the individual and their query, creating a more satisfying experience of information seeking. It saves the user from searching through a mere fraction of the thousands or even millions of "hits" related to their topic, and the various false leads that arise along the way. (Interestingly, these qualities are among those noted by Zhou and Li in their study on why users are shifting from traditional search engines to generative AI tools for health information searches [46].)

Beyond this smoothed out method for processing and selecting information, AI chatbots also offer, as stated above, a more intuitive means of online exploration and information seeking: the dialogic method. This form of information seeking is enhanced by AI chatbots' use of first-person pronouns, hedging, and natural language responses [47], which allow for users to carry on "conversations" with chatbots that appear bi-directional but are, in fact, nothing more than quickly-adapting statistical models that have learned how to respond to human interlocutors [48].[7]

This becomes problematic when, as Li and Sinnamon note: "people often rely upon heuristics (rules, cues, shortcuts) rather than in-depth analysis of features" [3, p. 207]. They cite Taraborelli [50], who "attributes this to a reliance on predictive judgement of quality, based on reputation, rather than evaluative judgement" [3, p. 207]. Indeed, Kim et al.'s study on the impact of LMs' expression of uncertainty on user trust and reliance found that "people tend to agree with the AI system when its responses are provided," suggesting a natural propensity to take the LM's responses at face value [47, p. 827]. The study also found, however, that "AI's uncertainty expression decreases agreement with the AI system" [47, p. 827]—so, that trust and reliance in AI systems are to a large extent a matter of the chatbot's modality of certainty in its delivery of information. Instead, as Agustin Startari writes, LMs gain their authority and credibility through grammar alone; the grammatical structure of AI-generated texts is "precise, context-aware, and—often—

[7] For conflicting perspectives on the utility and efficacy of this dialogue-based method, see Seredkina and Liu [49] contra Ma, Chen, Li and Liu [6])

indistinguishable from expert human writing," which "suggests that linguistic form can function as a simulation of authority, displacing the need for a thinking agent behind the utterance" [51, p. 4]. In his words: "Syntax replaces ethos: grammatical competence becomes a simulation of epistemic competence" [51, p. 4].[8] This stands in stark opposition to the trust and reliance garnered by human experts, who must themselves undergo a lengthy process of gaining knowledge, recognition, and support in order to establish (and keep) public trust.

To further complicate the question of trust in AI-generated content, Gallegos et al. found that even when content is labelled as AI-generated, its persuasive effects are not diminished [52]. This is a concern because it points to the fact that the onus is on the LM (and its programmers) to moderate and mitigate users' expectations of trustworthiness. Further concerning is the fact that researchers from Google DeepMind have acknowledged that AI assistants may use false information to develop persuasive but misleading arguments [53]. Even when prompted to list their sources for information, an advanced model may also selectively choose sources that it hypothesizes humans will find most persuasive [53]. When coupled with other techniques to enhance the perceived humanness of responses, this shift in information seeking could lead to increased (but obscured) bias in results. And so, as with medical LMs, the user also requires a certain level of knowledge and familiarity with the topic under consideration in order to identify if, when, and how the generated information might be faulty. That is to say, there are multiple processes that must operate in tandem in order for AI-supported information seeking to be effective; the user must also be thinking critically and engaging in a self-reflexive manner (and have a certain amount of preliminary knowledge) in order to identify potential errors or untruths. However, this responsibility can be overshadowed or falsely assuaged by generated outputs that seem to confirm (but may not actually align with) users' expectations or hopes with regard to the validity of the information. As such, the experience of interacting with LMs inhibits friction, creating a smoother process in both the senses of extracting information and of personal engagement with the information-giver.

C. Key Concerns

When we combine the potential for misleading AI-generated information with the shift towards machinic, dialogic information seeking practices, *and* a potential decrease in users' ability to critically analyze and assess texts (and to engage in deep and sustained information seeking and gathering), several areas of concern arise. The first is the threat to expertise itself. Rather than seeking out "expert" opinions through contact with human experts (either direct contact, such as with professors or industry professionals, or indirect contact through searching through journal articles or academic books), more learners are turning to the AI experts that are being increasingly integrated into digital devices and information seeking platforms.

On the information seekers' level, if there is an increased reliance on AI for research support, users may struggle more with identifying reliable sources, interpreting texts, and thinking critically [54], [55]. Responses that offer pre-selected information through dialogic interactions, which contain *signifiers* of expertise and intelligence, muddy a user's judgement in verifying the relevance, utility, and accuracy of the information they intended to seek. Furthermore, circumventing these crucial processes may, for early researchers, jeopardize the development of core scholarly skillsets.

It is also worth noting the types of information users seek when they engage with generative AI. As Chen et al. described in their study of help-seeking behaviors in students, when learners seek "help from AI technology such as intelligent tutoring systems… learners' help-seeking activities tend to only focus on the help that provided a copyable answer" [56, p. 4]. They found that not only do student users show a preference for AI experts over human experts, but users also circumvent the process of learning itself by searching for "copyable answers" that will achieve the instrumental goal of succeeding on a particular task or assignment. As such, AI literacy [57], [58] and discipline-specific generative AI training are important, but more complex issues must be addressed in order to correct or rethink these information seeking habits and aims.

Lastly, the question of privacy access arises once again. Many AI chatbots and tools are locked behind paywalls; as such, maintaining access to the most sophisticated LMs is a matter of financial ability, as well as access to devices and reliable internet connectivity. Furthermore, free versions of AI platforms often leverage user data to improve their models, and thus non-paying users must be wary of inputting their personal or private information. As Bojd et al. found, "individuals prefer human experts to AI chatbots in general (algorithm aversion); however, the relative preference for AI chatbots is higher in stigmatized situations" [59, p. 3]. And, whereas users might be concerned about anonymity, they are not as highly concerned about privacy. Equal and confidential access to LMs is therefore also an equity issue that may grow in proportion as the sophistication of LMs continues to increase, especially where accuracy, truthfulness, and privacy are at stake. As such, questions of access must be considered going forward, particularly because procedures surrounding the use of AI chatbots are developing rapidly in ways that could further exacerbate the gap between users of paid and unpaid versions.

V. Conclusions and Future Work

In this paper we have explored how procedures for information seeking are being reshaped by new generative AI usage practices. The subtle reshaping of longstanding procedures bears examination, because processes *reveal* and *reinforce* the logics (explicit or implicit) that structure human behavior on both an individual and collective level. The arguments that underlie AI-supported information seeking practices tend

[8] "Unlike classical forms of authority—religious, political, or academic—legitimized through visible hierarchies and traceable sources, AI-generated authority operates without a face, without a signature, and without assignable responsibility. Its legitimacy arises not from attribution but from linguistic performance: a statement "seems true" because it is well-formed. Grammar, in this context, is not a mere formal vehicle; *it becomes the criterion of legitimacy itself*" [51, p. 4], emphasis added.

towards an individualistic, impersonal angle that overwrite the intensely *human* experiences integral to gaining and sharing knowledge.

As the shifting landscape of AI continues to evolve, and as social acceptability of AI grows [60], it is crucial that both information seekers and experts remain vigilant of the constraints and potential consequences of AI-supported information seeking. This is not to say that traditional means of information seeking are not also fraught with challenges. As we have discussed, in-person medical information seeking is complicated by issues of access to, and experiences with, medical institutions; meanwhile, novice information seekers must contend with ever-growing archives of information, high stakes from their institutions, and perhaps a lack of confidence in their own abilities.

Nonetheless, AI information seeking also actually reinforces the *need* for trained experts, even as it seems to supplant them. It is ill-advised for an individual to use a LM system to answer a question or complete a task that they don't fully understand (and are thus not able to independently verify)—especially if they will then take action based on responses they perceive to be correct. While this is also, of course, possible with advice from a human, the obscuring of agency and intention seen in generative AI chatbots is an important part of the equation that is too easily glossed over [15].

In sum, there are many reasons why information seekers might want to switch to AI-supported information seeking, but there are many more reasons why we should aim to build support networks of human beings, rather than relying on neural networks trained to respond probabilistically to queries.[9] It is telling that, according to van Woudenberg et al., "ChatGPT fails to meet the criteria of authorship because it lacks the ability to perform illocutionary speech acts such as promising or asserting, lacks the fitting mental states like knowledge, belief, or intention, and cannot take responsibility for the texts it produces" [61, p. 34]. These are all aspects integral to the development of expertise in a subject, and so the disqualification of LMs from this class should be taken seriously.

Across the multiple types of potential human-AI relationships, more research is needed into topics such as expertise, trustworthiness, and privacy [53], [62], [63] in both medical and academic settings. Some future areas of research stemming from the examples discussed here: comparisons of the patient experience with clinical in-person versus medical AI scenarios; longitudinal studies of early career researchers who utilize AI chatbots for research assistance; and more studies that look critically at the reception of AI-generated information in other information seeking contexts, such as law, environmental studies, or politics. Furthermore, the rhetorically inflected critique of generative artificial intelligence and information seeking practices we offer here could also be productively applied to other facets of AI (such as personalized chatbots or image generation) or other emerging technologies (such as virtual or augmented reality).

[9] Indeed, there is a burgeoning movement to offer "AI-free" products, which are touted as offering more transparency and accuracy—a trend we intend to monitor in future.

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